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In *Georgia* the peristome apparently has no function except to provide an opening for the escape of the spores. In most other forms the peristome is so arranged as to in a manner regulate this escape.

EXPLANATION OF FIGURES.

Fig. 1. 7. Half of a section of the peristome and operculum of *Georgia* (*Tetraphis*): a. Operculum composed of a single layer of cells; b. Tissue which fills the operculum and which splits into four parts to form the peristome. 8. Peristome of *Georgia* x 40.

SOME FURTHER OBSERVATIONS ON BUXBAUMIA.

BY ELIAS J. DURAND.

The interest I have felt in the notes on *Buxbaumia* in the last number of THE BRYOLOGIST has prompted me to add some of my own observations on this genus. I shall never forget the pleasure I experienced when, one spring day eleven years ago, Professor Dudley first pointed out to me some of these little plants growing on a shady bank close by the campus. Ever since that time when in favorable localities, I have kept my eyes open for these little "elves."

The open woods bordering the ravines about Ithaca furnish most congenial habitats for *B. aphylla*. On the banks of any one of a half-dozen of our larger gorges, I can be sure of finding at least a few of the capsules in suitable spots. By Coy Glen I have found it every few rods for a distance of nearly two miles on both banks. Near one stump I can collect hundreds of specimens in their season. It is a spot which I always visit with my classes. Were I not afraid of bringing smiles of incredulity to the faces of your readers, I should tell how I once dug down at random through a foot of snow by the side of an old wood road, and found capsules in the first hole dug! This does not mean that the plants are scattered uniformly over the whole surface, but long practice gives one a sort of instinctive facility in knowing just where to look.

The habitat of this species is with us very characteristic. The plant always grows in open woods, on soil which has a damp blackish appearance, with a tinge of green due to the persistent protonema. Such spots often have a sparse growth of other mosses and lichens, but show no more traces of rotten wood than other woodland soil. I have never found *B. aphylla* on wood or logs. Neither have I been able to establish any uniformity in the direction of the capsules on level ground. On sloping banks, however, they always stand with their ventral sides down the hill, as Haberlandt long since pointed out.

The young sporophytes begin to appear early in September, when they are entirely covered by the thimble-shaped calyptras. The latter are ruptured by the elongation of the sporogonia exactly as in the other Bryineae. Growth is rather rapid until the last of October or the first of November, when the majority of the capsules are about one-half or two-thirds grown. Occasionally development is much later than these periods. During the cold months of winter there is little or no development of the capsules, which remain a bright green,

owing to the presence of chlorophyll in the tissues. With the warm days of late February or early March, growth begins again, and the color changes from green to brown as the plants mature. Usually by the middle of March or the first of April the spores are ready for dispersion. Sometimes in sheltered spots the capsules remain unbroken until summer. The spores may germinate at once, giving rise to a protonema which is in no way peculiar among the mosses.

Some authors have used the word "pseudopodium" in describing the seta of *Buxbaumia*. This term, as applied to *Sphagnum* and *Andreaea*, indicates a prolongation of the axis of the leafy gametophore, which bears the sessile capsule at its apex. The pedicel of *Buxbaumia* is, on the contrary, a part of the sporophyte as in the other Bryineae, and is, therefore, a true seta, with its lower end imbedded as a foot in the tissue of the much-reduced gametophore.

Buxbaumia indusiata Brid. also occurs with us, but is much rarer than *B. aphylla*. I first met with this species in October, 1893, in Enfield ravine, one of the largest of our glens. Since then it has been collected at a half-dozen other spots in the same gorge. In fact, I seldom visit this interesting place without seeing a few capsules. More recently I have found plants at single stations in both Buttermilk Ravine and Coy Glen. Besides these, I have seen specimens kindly sent me by Professor Dudley, and collected by him in Fall Creek and Cascadilla ravines, the latter station being actually on the University campus. We have thus within eight miles of Ithaca five different stations for this species, but, although I have searched the region pretty diligently, no others have been found.

With us *B. indusiata* always occurs on very rotten moist logs and stumps, often along with liverworts and other mosses. The wood is usually so badly decayed that it may be picked to pieces with the fingers. The individuals occur singly and widely scattered, and are very hard to see. The whole habits of our two eastern species are so totally different that no one ought to have the slightest difficulty in distinguishing them even without the aid of stomata. I have not been able thus far to obtain much information regarding the development of the rarer form. I have collected it only in the fully or nearly mature state, in October, November, December, April and May. Specimens may be found on the same log year after year.—*Botanical Department, Cornell University.*

BY ELIZABETH G. BRITTON.

Buxbaumia aphylla has the reputation of disappearing from its recorded stations, but on one old stump in the Hemlock Grove, in Bronx Park, I have collected it for four years successively, and last year there were as many as fifty fruiting plants. These did not come to maturity, however, as the first freezing cold weather killed all but a few. There was no snow to protect them. The pedicels remained for a year later. By the beginning of September, five new stalks were found; these had developed green capsules by November, and when last seen were still growing. This year there has been snow to cover them, and I took care to give them shelter with a few hemlock boughs. Mr. Williams found only two capsules growing out of the end of a "decorticated log," little decayed, and with no other mosses growing with them. It is the most unusual record for this species.

B. indusiata begins to develop earlier. In the Adirondacks I have collected well-formed capsules in August and September. Prof. C. H. Peck found it mature in October in the Catskills, and Mr. Durand at Ithaca, N. Y. It grows on decaying logs and stumps with other mosses, especially *Georgia pellucida*.

B. Piperi grows on moist banks and on decaying logs, and matures in the fall from August to November, and begins to form the capsules in March, according to Mr. J. B. Leiberg.—*New York Botanical Garden*.

MARCHANTIA AND CONOCEPHALUM.

BY WILLIAM C. BARBOUR.

The species selected for this opening paper upon the Hepaticae are common everywhere, but are easily mistaken, each for the other. *Marchantia polymorpha* L. here considered, is the only species of the genus which will be found by our readers unless they live in the Southern States. This species is widely distributed in North America, Europe and Asia, and has also been collected in Java and in the Azores Islands.

Conocephalum conicum (L.) Dumort. has practically the range of our *Marchantia*, with the addition of northern Africa. Both species are found growing on moist earth, though *Conocephalum* seems partial to damp shaded rocks. The thallus of each is prostrate upon the ground, and when the growth is vigorous, is much overlapped and interlaced.

The thallus of *Marchantia* is generally once or twice forked, from one to three (rarely more) inches in length, and of a rather peculiar dull green color. The midrib shows very plainly, is quite broad, dark beneath, and bears many root hairs. The surface is areolate, the cells being diamond-shaped and supplied with stomata. The species is dioecious, that is, the male and female



Fig. 1.

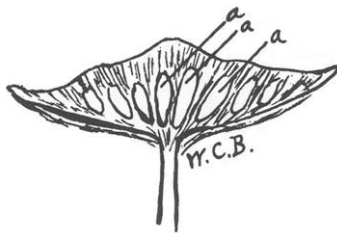


Fig. 2.

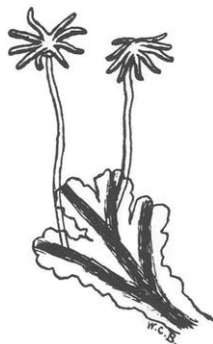


Fig. 3.

receptacles are borne upon separate plants. The male (Fig. 1) receptacle has something the form of a Japanese umbrella, being raised upon a stalk half or three-quarters of an inch above the surface of the thallus, and cut into eight